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cussions there appeared a feature which struck me as of the greatest value. With us the discussion is rarely, if ever, reported, but at Berlin as soon as a speaker had finished his discussion, a page handed him a folio of cardboard with pencil, paper and blotting paper (there are fountain pens in Germany), and the substance of his remarks was at once jotted down and handed to the secretary. For any society which wishes to publish a full account of its proceedings some such method would be of great importance, while any one who has ever acted as secretary and has later tried to get together abstracts of the discussion will at once recognize its value.

J. S. KINGSLEY

PARIS,

April 28, 1908

#### DATES OF EARLY SANTORIN AND ISCHIAN ERUPTIONS

OWING to conflicting literary sources and the difficulty of reconciling them, the chronology of early volcanic eruptions in islands of the Mediterranean, especially those of the ancient Thera and Pithecusæ, is involved in much uncertainty. The dates assigned to the first two or three eruptions of Thera have been the subject of much discussion, as it is a matter of some historical importance that they should be determined with as much precision as possible, in order thereby to fix divers contemporary events.

A welcome contribution to the literature of this subject is to be found in a recent number of *Hermes* (43, p. 314), in an article by Professor A. Klotz, of Strassburg, entitled "Die Insel Thia." Reasons are given by him for regarding the following as authentic dates of the first three outbreaks of the Santorin group known to have taken place during continuous history: B.C. 196 and 66; A.D. 46. Through a misunderstanding of Pliny's text the last of these is commonly referred to the year 19 A.D., and the intermediate one is seldom mentioned in geological treatises. For a list of eruptions occurring during our present era one may consult the writings of Fouqué and Alfred Philippson, the latter in volume 1 of "Thera" (1899). These two geologists, and also H. S.

Washington,<sup>1</sup> have discussed the physical evidence for estimating the time-interval since the earliest eruption of all which can be associated with a period of human culture, and find reason for assigning it to the proto-Mycenæan, or roughly speaking, 2000 B.C.

Early Ischian eruptions have likewise afforded material for debate. A list of all known disturbances is given by Fuchs in his elaborate monograph, "L'Isola d'Ischia," and a slightly different chronology is proposed by Ettore Pais in his recent volume on "Ancient Italy" (1908). According to this author, we have authentic accounts of four eruptions of Epomeus during classical antiquity, as follows: (1) a very early one which drove out the Eretrians and Chalcidians; (2) that which occurred shortly after 474 B.C., and caused the Syracusans to leave the island; (3) that which took place shortly before the birth of Timæus (*ante* 352 B.C.); and (4) one in 91 B.C., which is mentioned by Julius Obsequens. The same author also undertakes to identify the circular lake described by Pliny as having been formed by an earthquake, with the modern Porto d'Ischia.

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#### SPECIAL ARTICLES

##### A NOTE ON THE PROPORTION OF INJURED INDIVIDUALS IN A NATURAL GROUP OF BUFO

IN "Darwinism To-Day" (p. 84) Kellogg draws attention to Conn's reference to a maimed frog which was able, in its natural environment, to survive so serious a loss as the whole of both feet, as illustrating the idea that "selection is not so rigid as to eliminate *all* unfit individuals." Probably every naturalist could cite from his own experience many analogous instances of survival after more or less severe injury. Little is known, however, regarding the actual proportion of maimed individuals in a given group.

In making a study of correlation<sup>2</sup> in the common toad (*Bufo lentiginosus americanus*, LeC.) I had the rather unusual opportunity

<sup>1</sup> *Amer. Journ. Arch.*, 9, p. 504.

<sup>2</sup> *Jour. Exp. Zool.*, IV., 4, 1907.

of individually examining practically an entire natural group and was surprised by what seemed to me the large proportion of injured individuals which were able to live on in an apparently normal fashion. The society consisted of about 450 toads, of which 434 came under careful observation. Of these, 22, or 5.07 per cent., were noticed which showed the results of injury. Many of these injuries were slight, to be sure, yet from the point of view which Conn and Kellogg were considering they should be counted. The list of injured was as follows:

Parts of toes lost, one or both feet: 13 individuals.

One or both feet crushed: 2 individuals. These both were recently wounded and might not have survived long.

Old flesh wounds on arm, thigh and side of body: 1 individual.

Shank broken, healed and 1 to 2 mm. shorter than normal: 4 individuals.

One foot missing and fresh wound on ankle: 1 individual.

Right hand and foot missing: 1 individual. Stumps covered with heavy callosities. In this specimen the normal gastrocnemius muscle weighed 0.435 g., while that of the injured side weighed but 0.180 g.

Shoulder-girdle (coracoid and clavicle) broken completely across near the mid-line: 1 individual. This break had not healed; the ends projecting ventrally under the skin had become covered with heavy callosities.

That injuries such as these are not very considerable factors in non-survival is indicated by the fact that the average weight of the 22 injured specimens was not very different from that of the entire colony—38.5 g., as compared with 44.8 g. The number of injured seems too small to justify the application of precise methods of comparison.

There is the possibility that the males are more liable to injury than the females, since the ratio of injured males to injured females is as 9:10, while in the entire group the ratio is less than 7:10. This is of interest in connection with the fact, brought out in my study on correlation, that the males are

throughout their organization less perfectly correlated than the females. Their lower degree of structural correlation may be partly responsible for their greater liability to injury.

But this 5 per cent. injured does not tell the whole story. In addition 16 individuals, or 3.68 per cent., were noticed showing structural "abnormalities," which would seem to have been at least as serious as regards survival as most of these injuries, perhaps more so, since the individual would be affected throughout its existence, whereas an injury would become a factor only after the individual had probably a fair start in life. The following were noted:

One foot misshapen and small: 2 individuals. Possibly the result of injury when very young.

One foot with six toes: 1 individual.

One foot with four toes: 1 individual.

One foot with three toes: 1 individual.

Gall-bladder absent: 5 individuals.

One lobe of liver more or less completely reduced: 5 individuals.

Ventricle deeply furrowed ventrally: 1 individual. Possibly the result of injury when very young.

These individuals were again nearly but not quite of average weight and the males were far outnumbered by the females, the normal ratio of 7:10 being reduced here to 2.3:10. This might possibly indicate that the more perfectly correlated females are the better able to survive congenital abnormality.

This gives a total then of 8.75 per cent. of a natural animal group showing injuries or "abnormalities" which would seem to be rather serious handicaps, but which prove not to be such. Probably other injured or "abnormal" specimens would have been found if attention had been directed toward the subject at the time of observation.

It may or it may not be permissible from the present point of view to include in the list of "abnormal," six specimens of a distinct "variety" distinguished by color and markings, odor, external proportions, character of skin, etc. If these should be included as ab-

normal the total percentage of "unfit" runs up to 10.1.

It should be added that, on the whole, conditions of life were not rigorous for this group. Food was more than abundant, means of protection and concealment ready, and natural enemies apparently not numerous, so that these percentages may prove to be unusual. They certainly seemed so to me and they are noted here not only as bearing on the general subject of selection, but in the hope that others may make known similar data.

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#### BOTANICAL NOTES

##### FLOWERING PLANT NOTES

W. C. Worsdell in the April, 1908, *Journal of Botany* discusses "The Affinities of *Paeonia*" and concludes that this genus is more closely related to *Magnoliaceae* than to *Ranunculaceae*, but he suggests that it should more properly be referred to a family ("order" in the older sense) by itself which he names *Paeoniaceae*.

Dr. Ernst A. Bessey's paper on "The Florida Strangling Figs," from the forthcoming nineteenth Annual Report of the Missouri Botanical Garden, deals with two native species of *Ficus* (*F. aurea* and *F. populnea*), the first of which has the curious habit of beginning its growth as an epiphyte and later becoming terrestrial by sending down numerous slender roots which eventually thicken and fuse together, finally wholly surrounding and strangling the host. Some striking photographs are reproduced in the plates. The curious fact is brought out that in *F. aurea* the seeds require light in order to germinate, no doubt related to its epiphytic habit.

F. M. Bailey, colonial botanist, continues his systematic "Contributions" in the *Queensland Agricultural Journal*, the November (1907) number containing descriptions of four new orchids from New Guinea, and the February (1908) number one new grass, *Arundinaria coboni* from Queensland.

Professor Doctor J. W. Harshburger has published in the *Proceedings of the American Philosophical Society* (Vol. 46, 1907) a suggestive paper on "Taxonomic Charts of the Monocotyledons and Dicotyledons." Two charts are reproduced, one of the monocotyledons, and the other of the dicotyledons, in which each family is given a place in a genetic tree. In the second chart the Gamopetalae are shown to be derived from two great phyla.

H. S. Hammond publishes a short account (accompanied with a plate of many good figures) of the embryology of *Oxalis corniculata*, in the February (1908) *Ohio Naturalist*, in which he calls attention to "a multicellular haustorium-like organ which is formed from the basal cells of the suspensor," and which burrows its way into the integuments until it finally reaches the testa.

Agnes Chase finds (*Botanical Gazette* for February, 1908) that the grasses of the genus *Triplasis* have fertile cleistogamous flowers enclosed in the sheaths of the stems. In *Amphicarpon amphicarpon* similar cleistogamous flowers occur in the sheaths of the subterranean stems.

Recent numbers of the "Leaflets of Philippine Botany" contain papers on "*Freycinetia* from Lucban," and "Some New Leguminosae" (by A. D. E. Elmer), "Some New and Critical Ferns" (by E. B. Copeland), and "A Fascicle of Tayabas Figs" (by A. D. E. Elmer). In the last paper forty-one species are enumerated.

In a sixty-six-page paper in the *Annals of Botany* for April, 1908, Ethel Sargent discusses the "Reconstruction of a Race of Primitive Angiosperms," this being an abstract of a series of eight lectures delivered in the University of London in May and June, 1907. In it the author holds to the monophyletic origin of the angiosperms, and avows her "complete agreement with the general conclusions" reached by Arber and Parkin in their "Origin of Angiosperms." These general conclusions, it will be remembered, are that the angiosperms were derived from cycadean ancestors similar to *Bennettites*, and